KEY
Section 1: Algebra

1.1 $1 \pm i\sqrt{6}, \ \pm\sqrt{3}$
1.2 a,c
1.3 a,b,c
1.4 $(1625)(34)$
1.5 a,b,c
1.6 (a) 4, (b) 2
1.7
$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 2 & 3 \\ 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

1.8 a,b
1.9 b,c
1.10 $\alpha = 1/4, \ \beta = 0$

Section 2: Analysis

2.1 yes, 0
2.2 (a) convergent, (b) convergent
2.3 a,b,c
2.4 a,c
2.5 (a) not uniformly convergent
(b) uniformly convergent
(c) not uniformly convergent
2.6 $4/e$
2.7 a,b,c
2.8 $\pi/16$
2.9 3
2.10 a,b,c

Section 3: Topology

3.1 b
3.2 a,c
3.3 a,b
3.4 b,c
3.5 a,c
3.6 a
3.7 b,c
3.8 none
3.9 none
3.10 $\{N, M\}, \{B\}, \{H\}$

Section 4: Applied Mathematics

4.1 $my'' = mg - c(y')^2$
4.2 $x' = y; \ y' = -Py - Qx$
4.3 $8\pi^2/15$
4.4 $(n+1)a_{n+1} = (p-n)a_n, \ n \geq 0$
4.5 $y = (1+x)^p$
4.6 (a) Elliptic, (b) Hyperbolic
4.7 0
4.8 $(x/a, y/a, z/a)$
4.9 $12\pi a^6/5$
4.10 $u_t = u_{xx}$

Section 5: Miscellaneous

5.1 $(2^{n+1} - 1)/(n+1)$
5.2 $(2n)!/n^2$
5.3 $2/3$
5.4 a,b,c
5.5 $\sin\theta\cos\theta$
5.6 $1 - \log 2$
5.7 $2\sqrt{2}$
5.8 $\frac{1}{2} - \frac{1}{(n+2)!}; \ \frac{1}{2}$
5.9 $abc + 1 = 0$
5.10 $(2/3, 0)$

Note:
Accept any correct equivalent form of the answers.